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Arboretum *bulletin*

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Arboretum bulletin

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COVER PHOTO:

Flowering branch of *Prunus Hillieri*

PHOTO BY: DON NORMARK

What to Look for in the Arboretum

April — May — June

BEYOND question this three-month period, April, May and June, represents the high point of the Arboretum's flowering year. Probably more than three-fourths of our showiest plants will bloom during this quarter, including the majority of the rhododendrons, cherries, crab apples, magnolias, and others that constitute our most spectacular displays.

If the weather cooperates — which it may not do this year — Azalea Way will be the main center of attraction during the last week of March and the first weeks in April. The Japanese spring cherries, *Prunus subhirtella,* in all their varied forms should be at the height of their flowering period. The two weeping forms, 'Pendula' and 'Eureka Weeping,' found all along Azalea Way start the procession, followed closely by the 'Stellata' group northwest of Woodland garden and the type form growing on the west side of Azalea Way, about opposite Winter Garden. As soon as the early Japanese spring cherries begin to fade the Yoshino cherries, *Prunus yedoensis,* pick up the tempo of spring and carry on for about two weeks. They are usually accompanied by the bright pink Sargent cherry, *(P. Sargentii)* and its paler hybrid *P. Juddii,* the Judd cherry, both of which are scattered along Azalea Way with particularly good specimens at the north end opposite the Clubhouse and at the foot of Loderi Valley. Before these beauties have passed they are replaced by the first flowers of the Japanese ornamental cherries, *Prunus serrulata* varieties. The incomparable 'Shirotae' ('Mt. Fuji') is first, usually in the mid-weeks of April. 'Shirotae' is followed by 'Kwanzan,' 'Ukon,' 'Fugenzo' and many others, both on Azalea Way and in Rhododendron Glen, so that cherry blossoms can be seen well into May.

The cherries alone would make Azalea Way a place of rare beauty, but with the addition of the flowering eastern dogwoods *(Cornus florida)* and our native *Cornus Nuttallii,* as well as the many thousand azaleas, there are few areas that can compare with it for floral display. Our native dogwood is the first to flower in mid-April, soon followed by *Cornus florida* in early May. The azaleas begin earlier; at the south end of Azalea Way *R. Schlippenbachii,* the royal Azalea, often shows first color by early April and by mid-May they are all at their height, deciduous and evergreen. They will continue on until well into June when the western Azalea, *R. occidentale,* is at its best.

Mid to late May sees the spectacular burst of red, orange and yellow blossoms on the hybrid broom collection, *Cytisus scoparius* hybrids, northeast of Rhododendron Glen, while the fragrant *Styrax obassia* is decorated with white racemes of bell-like flowers about a week later. Our finest tree is south of the brooms in an Azalea bed next to the Broadmoor fence, with others nearly as good west of the Winter garden.

In the Glen, Rhododendrons and Magnolias will have been blooming in profusion since early April, first in one area then in another. Those who would like to follow the flowering here are invited to pick up the Rhododendron Glen leaflet in the office which gives the sequence of bloom in much more detail than can be covered in this short article.

Don't forget to visit Loderi Valley in May — early to mid-month — to see the *Rhododendron Loderi* clones with their numerous seedlings, and don't fail to enjoy the wonderful color and texture of the new foliage on the Japanese maples, in Woodland Garden in mid-April.

J. A. W.

The Arboretum; Fall & Winter 1962

B. O. Mulligan

LATE in September work was begun on a major drainage operation on the grass slopes between Rhododendron Glen and Azalea Way, an area which was never properly drained and has been becoming progressively wetter year by year.

The scheme involved digging almost 1,000 feet of ditches, averaging about 2½ feet deep, laying 6-inch drain tiles throughout their length and then filling in with washed gravel to the top. Drainage water from the slope will now find its way into the pond beside Azalea Way, and the whole area should be markedly improved as a result of this laborious task, which occupied our whole crew for several weeks. In the future, we hope to make much more use of this bank for planting purposes. At the same time another ditch 175 feet long was dug and tiles laid at the foot of the bank of rhododendrons below and east of the lookout, to remove surplus water and prevent it accumulating on our service road at this point.

While this work was going on another crew from the University was engaged in laying drains in several unduly wet areas in the Japanese garden, — at the base of the bank at the north end, behind the tea house and near the southwest service gate. All these will, we hope, likewise prove of benefit to the paths in those sections of the garden. A second stone drinking fountain was also erected there last fall, just inside the south entrance.

Following the severe southwesterly gale which hit Seattle in the evening of October 12th, when the wind reached a maximum of 65 m.p.h and averaged over 40 m.p.h. for five hours, 50 truck loads of broken branches had to be gathered up and hauled to the city dump, a task which occupied the best part of three weeks. We were fortunate to lose only thirteen trees in the Arboretum from this cause, and these nearly all native conifers. One of the broken western red cedars fell on and ruined a fine specimen of *Rhododendron* 'Azor'; another took the leading shoot out of a young magnolia, but considering the force and length of the storm and how closely planted is much of our ground, we really escaped very lightly. Amongst cultivated trees a large *Magnolia macrophylla* was blown over, and several locust trees wrecked, including our only example of the hybrid *Robinia* 'Idahoensis,' which we regret.

Early in December we started clearance operations close to the lagoon at the north end of the Arboretum, removing or thinning out unwanted native shrubs, cutting out dead wood and low branches, in order to make room for planting some large old rhododendrons to help in screening the approaches to the second Lake Washington bridge, only too visible in the background. This planting was accomplished a week before Christmas.

From there the crew proceeded south down Lake Washington Boulevard, spending several weeks of generally cold, dry weather in similar cleaning and burning work on both sides, much to the improvement of its appearance. On the west side, south of Boyer Ave., we went up to the probable line of the anticipated R. H. Thompson Expressway and continued along the side of Interlaken Blvd. almost to the Japanese garden. There we crossed over to the east and worked up the hillside, removing a great deal of surplus undergrowth and sapling wild cherry trees *(Prunus emarginata)* which had not been touched for many years. This has exposed large sections of native salal *(Gaultheria Shallon)* and *Mahonia nervosa,* which can now be seen from the Boulevard and will benefit by the additional light they receive.

This work has extended over almost the whole area from the lookout southwards to the Japanese garden, and, following our service road, to the rock garden. A small section of natural woodland south of the holly collection remains untouched. The cleared areas have provided additional spaces for appropri-

ate plantings, especially of trees, and some have already been set out.

In February the crew transferred their attentions to Loderi Valley, where several dead or dying western hemlocks and Douglas firs were removed, and the rhododendron beds heavily mulched with year-old leaves.

Severe pruning of some old native filbert bushes *(Corylus californica)* was accomplished in adjacent Woodland Garden, and drooping lower limbs removed from various western hemlocks and red cedars overhanging trails or grass areas. As a result, more space will also be available here for some fresh plantings.

New Plantings

From early October 1962 to mid-February 1963 almost 400 plants, of about half as many kinds, have been set out. Approximately one-quarter of this total comprised rhododendrons and azaleas, another quarter conifers of various types, mainly pines, true firs, spruces and junipers.

Amongst deciduous trees are several species of willows *(Salix)*, birches *(Betula)*, *Stuartia*, maples *(Acer)*, and horse-chestnuts or buckeyes *(Aesculus)*, the last on the hillside east of and overlooking the Japanese garden; they include the Indian *(A. indica)* and Japanese horse-chestnuts, *(A. turbinata)*, both raised here from seeds.

On the same hillside are placed additional firs *(Abies* species), an unusual, large-leaved maple, *Acer Trautvetteri*, from the Caucasus region of southern U.S.S.R., and *Acer* x *senecaensis*, a natural hybrid from Rochester, N.Y., whence we received scions of both trees in 1957 and 1959, respectively.

Four more young trees of Japanese cherries, placed near the south end of Azalea Way, include the beautiful, very large, single white-flowered 'Tai-haku,' not previously represented here.

An attractive and extensive group of rhododendrons, given by the Seattle Chapter of the American Rhododendron Society as a memorial to the late Endre Ostbo, of Bellevue, Washington, and including both rocks and a heavy bench of native red cedar wood, has now been completed. It is located along the trail between Rhododendron Glen and the peony collection.

On the upper south bank of Rhododendron Glen, close to the lookout, a small planting of *Camellia Sasanqua* has been made, in memory of the late Helen G. Buzard, whose passing was noted in the last issue of the BULLETIN.

Just north of Rhododendron Glen, on the west side of Arboretum Drive, a new bed has been made and planted, using three species of rhododendrons in the rear, azaleas in the center, and three seedling maples, hybrid forms of *Acer rufinerve*, for fall and winter color. Several young *Abies* trees are also located here and should eventually become permanent features.

Acquisitions

The total number of acquisitions of plants, seeds, cuttings or scions received during 1962 was 726, compared with 601 in 1961.

During the last three months of the year some items of particular interest were a collection of thirty-six kinds of camellias, from the U.S.D.A. Plant Introduction Station, Glenn Dale, Md., many originating in Japan, a few from Portugal; ten kinds of conifers, mostly dwarf forms, from the Parks Department, Rochester, N.Y.; a dozen forms of *Hydrangea macrophylla*, imported from England as a gift to us by Mrs. K. Winslow of Seattle; seven varieties or hybrids of *Hamamelis* and seventeen sorts of willows from the Arboretum at Kalmthout, Belgium; six forms of the Japanese *Ilex crenata*, from the Ida Cason Callaway gardens in Georgia, and amongst seeds a notable collection of eighteen native trees and shrubs, from Arizona and Nevada, by Mr. Carl S. English of Seattle.

Early this year we received seeds of five species of native pines, from Prof. M. Martinez, of Mexico City; of four species of Japanese alders, from Prof. S. Murai, of Takizawa, Japan; and most recently, of nine large-leaved types of rhododendrons, from the Royal Botanic Garden at Edinburgh, Scotland. These are all potentially valuable collections; some of them have been shared

with other similar institutions, in order to distribute the progeny more widely.

Library

This has been enriched by the following works, amongst others:

Sakura; Flowering Cherries of Japan, by Toemon Sano, (Mitsumura Suiko Shoin, Kyoto, 1961). Given by Arboretum Unit No. 8 (Else Frye) in memory of the late Mrs. T. C. Frye.

History of European Botanical Discoveries in China, by Dr. E. Bretschneider, (reprint, Leipzig, 1962). Gift of Mrs. F. Phillips, in memory of the late Mrs. A. E. Bogardus. Also the following item:

Flora Boreali-Americana, by W. J. Hooker, Vols. 1 and 2, (reprint, 1960, by H. R. Engelmann (J. Cramer), Weinheim, Germany, and Wheldon & Wesley, Ltd., Codicote, Herts, England).

Alberi Ornamentali in Italia, by G. Jucker, (Bergamo, Italy, 1958).

The Botanic Garden, by B. Maund, vols. I-VI inclusive, (London, England, 1878). Gift of Mrs. E. Conner Gray, Mercer Island, Wash.

Rock Garden Plants of the Southern Alps, by W. R. Philipson and D. Hearn, (Caxton Press, Christchurch, N.Z., 1962).

Plants Distributed

Between October 1, 1962 and Feb. 13, 1963 forty-three consignments of plant materials have been sent out. The majority went to other similar institutions in this country with which we exchange plants, a few overseas (to Santiago, Chile; Tokyo, Japan; Wageningen, Holland).

Some of the more unusual requests filled were from the U.S. Dept. of Agriculture, Ornamental Plants Laboratory, Delaware, Ohio, for scions of nineteen of our Japanese maples; from the U.S.D.A. Agricultural Research Center, Beltsville, Md., for cuttings of four shrubby willows possibly suitable for erosion control; the Southern Research Station of the Department of Lands & Forests, Maple, Ontario, for scions of six pines, both species and hybrids, to be used in breeding work; the Agricultural Experiment Station of Montana State College at Bozeman, for scions of four species of *Sorbus*. These are good examples of the value of an extensive plant collection to workers in other parts of the United States, or in other countries. We are glad to be of such service.

Weather and Effects

The first half of October brought welcome rainfall for our planting operations, but little in the second half; the month's total of 3.41 ins. was slightly over the normal. November was much wetter throughout the entire month, producing 6.87 ins. compared with the average 5 ins.

The first frost (32° F.) was recorded November 23, but no more until December 23 and 27; the fall weather could certainly be termed mild, since the average temperature for each of the three months was from 1.3° (October) to 2.3° (November) above the normal. In December, however, the rainfall was 1.59 ins. and in January 1963, 3.28 ins. *below* the average for those months, so we need more precipitation at the present time.

The coldest weather of the winter occurred January 10 through 13. The maximum temperatures for those four days in Seattle were 33°, 29°, 32°, 33°, with a strong N.W. wind blowing on the 10th. Minimum temperatures for the same dates were 22°, 17°, 18°, and 28° F. The last four days of the month were also distinctly cool, this time with winds from north to east; maximum temperatures ranged from 35° to 37°, minima from 27° to 32° F.

Although it is too early yet to say which plants, if any, have been killed by these cold conditions, there are some which look very unhappy, with brown and shrivelled foliage; these include *Eucalyptus Dalrympleana,* up to 30 ft. high, planted May 1957, species of *Eugenia* and *Myrtus,* from Argentina or Chile, *Hebe* from New Zealand, *Acacia dealbata, Viburnum japonicum,* certain of the rosemarys, and several admittedly tender shrubs planted against the greenhouse walls. Our one evergreen maple, *Acer oblongum,* has been defoliated but will probably recover. Various young plants in the screened lath

(Continued on Page 28)

A Selection of Spring Flowering Trees in the Arboretum

J. A. Witt

EARLY spring in the Puget Sound region is a time of flowering trees. Probably more species and varieties of small trees flower from mid-March to mid-May than during any other quarter of the year, and possibly even during the rest of the entire year. This is so true that we often tend to emphasize such trees as the *Stuartia* species and silk trees, *Albizzia Julibrissin,* because they give us a floral display other than in early spring. The two groups which make up the bulk of early spring flowering trees are the Japanese cherries and the crabapples, both of which are very adequately covered elsewhere in this issue. It is well, then, to examine a few of the other ornamental trees that we may expect to find in flower in the Arboretum during March, April and early May.

Mid-March is a time of fickle weather in the Puget Sound region; some years may find us basking in spring sunshine, in others we will be shivering in cold and snowy weather. As a result it is difficult to fix exact flowering dates for our early spring trees since they may vary one or two weeks either way. Usually though, we can expect certain species and/or cultivars to be in flower during this period.

One of the newer trees is also one of the most handsome for early flowering. It is *Prunus* 'Okame,' a hybrid between the Japanese *P. incisa* and the Formosan *P. campanulata,* made in England by Mr. Collingwood Ingram over twenty years ago. Our best plant of this fine cherry, growing on the west side of Azalea Way, west of the Winter Garden, is an upright tree of about fifteen feet that becomes a bright pink cloud when it is in full flower in late February or early March. The individual flowers, borne two or three on a stalk, are really light rose pink, but the calyx is red and the filaments are darker in tone than the petals. As a result the net effect is a sparkling pink which remains on the tree for the best part of three weeks unless that unpredictable March weather brings a hard frost. This hybrid cherry should become one of the most popular of early flowering trees for smaller gardens when it becomes more generally available.

Another member of the genus *Prunus,* but of an entirely different section, also flowers in early March or even in late February. This is *Prunus Amygdalo-persica* 'Pollard,' a selected form of the cross between the peach and the almond. Our tree, threatened by the R. H. Thompson Expressway, is in the grass area west of Lake Washington Blvd., below the footbridge to E. Lynn St. (fig. 1). It is an open tree with the typical habit of a peach, but with large one and one-half to two-inch soft rose-pink flowers carried in few-flowered clusters on both new and old wood. Again, as in 'Okame,' the blooming period is quite long — about three weeks. This hybrid has been compared in appearance to some of the flowering peaches, *Prunus Persica,* but it does not suffer from peach-leaf curl, that blight of most of the ornamental peaches. The fruit develops much like that of the almond but the kernel has a thick hard shell as in the peach and only the squirrels seem to enjoy them. The peach-almond cross is an old one, known as far back as the sixteenth century, but our hybrid originated in Australia before 1904.

Still another *Prunus* hybrid attracts our attention about the first of April. This is the Hillier cherry, *Prunus Hillieri,* the child of a mating between *Prunus Sargentii* and *Prunus incisa.* The habit is quite similar to the Sargent cherry, upright with ascending branches, but probably won't be as large since *P. incisa* is rarely taller than thirty feet. The flowers are mauve-pink in bud, then open into a soft pale rose with darker striation, but with the dark reddish calyx found in *P. incisa.* About an inch across, they are carried two or three on short peduncles (see cover). Our best specimen stands on the east side of Azalea Way at the foot of Loderi Valley and is now about twenty feet high. It appears that

Prunus x *Hillieri* will be a smaller edition of Sargent's cherry with softer pink flowers but with the same general habit and leaf characters.

Slightly before Hillier's cherry comes into bloom the magnificent form of *Magnolia Kobus* 'Wada's Memory' explodes into flower. This tree should be familiar to most BULLETIN readers since it was described in detail in the Spring 1959 issue, but it really must be seen near the head of Rhododendron Glen to be properly appreciated, rising out of a sea of rhododendrons with its mass of white dove-like flowers outlined against the blue April sky. The type *Magnolia Kobus* is a fine and lovely tree, but cannot compare with this selected form.

As the pristine white flowers of 'Wada's Memory' begin to fall others in the Arboretum's Magnolia collection attract attention. *Magnolia salicifolia* 'Else Frye,' a very fine form of the willow-leaf magnolia, is growing in the center of the magnolia area and is usually in full flower by mid-April. This selection was described in the BULLETIN, summer 1961. The Yulan magnolia, *M. denudata,* may have its white chalices of lemony fragrance open in early April, or perhaps even in late March if the spring is early. There are several older plants of this Chinese species growing in Rhododendron Glen, survivors of the abnormal early freeze in November 1955, the largest about twenty feet tall, although the tree may reach a height of thirty-five to forty-five feet in time.

On the southwest edge of Rhododendron Glen below the Lookout there is a collection of shrubs and small trees that are only too rarely used as landscape subjects in the Pacific Northwest. The *Amelanchier* species may be either shrubs, as in our native *A. alnifolia,* the western serviceberry, or tree-like, as several of the eastern American species are. Of these *Amelanchier laevis,* the Allegheny serviceberry, which may be nearly forty feet tall at maturity, and *A. canadensis,* the shadblow

Below

Prunus Amygdalo-Persica 'Pollardii'

FIG. 1 PHOTO BY: WHITIE MARTEN

or downy serviceberry, a tree reported to reach sixty feet in height, are among the best in the Arboretum's collections. Both similar trees tend to be multi-stemmed, with slender branches and grayish bark which contribute to a pleasing winter habit. In mid-April, before the leaves have expanded, the white to ivory, small apple blossom-like flowers cover the branches for about a week, seldom longer. These are then followed by the edible purple fruit in midsummer and attractive golden yellow to orange fall foliage color. Even though the serviceberries have a short flowering period they have enough other attractions to merit wider use in our gardens.

Native plants too often are replaced in our affections by exotics, but our Pacific dogwood, *Cornus Nuttallii,* will never be. The Arboretum was fortunate in having a large number of mature trees in a number of locations. Many of these were above average in flower size, freedom of flower, or were fall flowering, and some of the finest were propagated; fortunately so, since many of the best "old timers" were killed in the 1955 freeze or have since been destroyed. There are a number of grafted plants of selected forms planted through the Arboretum with the greatest concentration along Arboretum Drive E., slightly south of the Magnolia area. Their flowering in mid-April is living proof that selection pays. Two *Cornus Nuttallii* 'Eddiei' are also here, a selection of the H. M. Eddie & Sons, Ltd. nursery in Vancouver, B.C. Although this clone has a very fine spring flower it is perhaps at its best when the second bloom occurs September-October; then the large whitish bracts of the "flower" are set off by the varicolored leaves in their autumnal tints of russet and creamy yellow.

As the end of April nears the silverbells begin expanding their drop-like buds into the silvery-white bells that give them their common name. Perhaps the most showy of the several species grown in the Arboretum is *Halesia monticola* var. *vestita,* the mountain silverbell from North Carolina. The beautiful multi-trunked specimen growing in the Rhododendrons on the north side of the utility building in the office area is the finest example of this tree in the Arboretum and seldom fails to produce quantities of swinging white blooms by May Day.

The above list is just a sampler of a few of the best flowering trees for early spring, and is so incomplete that we should certainly be able to add many, many more. What about the large *Prunus Padus* with its chains of pendent white flowers, hidden away on the west side of the parking lot near the Madison St. playfield, or the fragrant flowered *Rehderodendron macrocarpum* growing near the winter garden, or the various bright redbuds, *Cercis* species, in the Philadelphus area? All these and a host of others make early spring the time of flowering trees.

Crabapples with Persistent Fruit

W. H. Warren*

Few ornamental crabapples produce fruit which remains attractive very long under coastal conditions in British Columbia. Two of the best are *Malus zumi* var. *calocarpa* and *Malus heterophylla* 'Mathews.'

Malus zumi var. *calocarpa.* Our twenty-two-year-old tree is about 15 feet high and 20 feet broad on rather poor soil. It is rather densely branched, semi-upright in habit, with single white flowers in May and bright red fruit about half an inch in diameter which is coloured by August and persists until January.

Malus heterophylla 'Mathews.' Grows about the same size, 12 feet high and 15 feet wide at the same age. It is not quite so dense in character. Its fruit is similar in size, an attractive gold colour, persisting until January. *M. heterophylla* is an old hybrid between *M. coronaria,* native of the eastern United States, and *M. pumila,* the wild European crab apple.

*Park Administrator, Victoria, B.C.

A Second Look at Some Flowering Cherries

W. H. Warren*

IT IS about thirty years ago since I first became interested in flowering cherries. Regular trips used to be made to Volunteer Park, Seattle, when they were in bloom to see and discuss them with the late Jacob Umlauf, Superintendent of Parks, and Fritz Leissler, who supervised the early establishment of the Arboretum.

It is now recognized that with inadequate inspection at both ends, a great many virus and other diseases were introduced into the United States and Canada from Japan on imported cherry stock. The fact that some trees of considerable age are small and have little vigor may indicate virus infection. This condition may also be associated with some varieties. Besides virus diseases, trees have been retarded in our propagating work by soil deficiency (manganese), club root, brown rot, thrips and symphylids in the soil.

Brown rot, also known as blossom blight and twig blight, is common with tree fruits but its seriousness usually is not appreciated on ornamental cherries. It attacks the opening flower, the young leaf and the vegetative bud. They turn brown rather quickly almost as if scorched by fire. Repeated coverage with a fungicide is recommended before, during and after blooming. Captan is recommended at six tablespoons to five gallons of water. Under moist humid conditions the disease may be severe. Double varieties and weak growing cherries are the most susceptible. We have had varieties like 'Okiku-zakura' (Cheal's Weeping') wiped out in one season. A cherry which flowers chiefly at the tips of the branches with few active leaf buds along the older branches has probably been reduced to this state by brown rot. I believe the Japanese preference for varieties with single flowers is associated with the fact that the doubles are more susceptible to this disease. The bunchy habit of bloom in some varieties such as 'Torano-o' ('Tiger's Tail') has probably been accentuated by this disease.

*Park Administrator, Victoria, B.C., Canada.

Some of the most vigorous and hardy cherries are 'Kanzan,' 'Yoshino,' 'Shirotae' ('Mt. Fuji') and the Sargent Cherry. There is a specimen of 'Shirotae' about seventy years of age in Victoria.

Inferior stocks of flowering cherries are still propagated by nurserymen. We imported some of it in 1957 from Oregon after losing our own 'Yoshino' stock in the 1955 freeze. There is considerable variation in 'Kanzan' stock—variation in vigor, colour and time of bloom. Similar remarks might be made of the Higan cherry. Establishment of some source of elite true stock may be helpful.

One of the most interesting species is the Higan cherry, *Prunus subhirtella* and its hybrids. I am convinced there are good variations and forms not yet introduced into commerce. We imported 'Fukubana' and 'Atsumori,' splendid double varieties, from K. Wada, Japan, in 1940. Mixed amongst them were a couple of unnamed, beautiful open-faced double shell-pink flowered trees which we lost soon after. I have never seen them described in literature. At Keukenhof Gardens, Lisse, Holland, there grows a variety called 'Dahlem' which resembles *Prunus subhirtella* 'Autumnalis' in appearance, apparently not introduced into commerce. F. J. Grootendorst, Holland, recently sold *Prunus subhirtella* 'Floreplena,' an open-faced, ¾-inch double shell-pink flower which soon fades white. I think there is still room for selection of vigorous upright forms of the species, with large flowers and good autumn colour. 'Pandora' is a hybrid between *P. subhirtella* and *P. yedoensis* which looks like an improved upright form of Higan cherry with larger pale pink flowers which bloom later. We have a tree in Beacon Hill Park, Victoria, of similar origin and appearance, grown from seed, which is unnamed as yet but is more widespread in habit like 'Yoshino.' Some streets will be planted with it next year.

Crab Apples in the Pacific Northwest

A. N. Roberts and L. T. Blaney*

THE FIRST trees in the crab apple collection at the Lewis-Brown Horticultural Farm of Oregon State University at Corvallis were planted in 1942. Over the past twenty years more than 100 species and cultivars have been grown and observed in this planting. The planting has never been a static one, for trees have been discarded and new ones added continually during this twenty-year period. The better cultivars of the collection are now being moved to a new location on the farm where they will be able to assume their characteristic sizes and habits. Trees for the collection were obtained at first from commercial nurseries. This procedure was abandoned when we found that crab apples were often not true to name in the trade. Much time was spent trying to identify some of those obtained originally. In recent years we have been propagating trees from scions obtained from the Arnold and other arboreta.

Some of the crab apples in the collection come close to combining the qualities found in the most desirable of our woody ornamentals, in that they bear beautiful flowers and attractive fruits, have good foliage characteristics, tree form and structure, are winter hardy, disease resistant, and easy to grow. A great many crab apples, including the majority of those in our collection, were described for gardeners in 1955 by Dr. Donald Wyman in his *Crab Apples for America***. In 1959, Arie F. den Boer of Des Moines, Iowa, was author of *Ornamental Crab Apples,* published by the American Association of Nurserymen, which is an excellent evaluation of the best of the ornamental apples, based on many years of careful study by den Boer of trees not only in the Midwest but throughout the United States and the world.

Little can be added at this time to the complete descriptions and considered comments made by these men. There is some value, however, in presenting local and regional data which either verify the findings of others or which point up the relative value of certain crab apples locally. With so many cultivars available to the discerning gardener, landscaper and park superintendent, it is important also that variety lists be reduced to the best that have been tested to date. What is best, of course, depends in great measure upon what is expected of the tree. The size of the garden or public planting, the plant structure and habit desired, the importance attached to certain foliage characteristics, and the time, color and quality of the flower and fruit display all must be considered in evaluating the ornamental value of a tree.

The accompanying figure (fig. 2) summarizes for 97 cultivars in our planting, ten years' flowering (1953-62) and four years' fruiting (1957-60) records. The flowering period is considered to be the time elapsing between opening of the first blossoms to completion of petal fall. The time elapsing in the late summer, fall and winter when the fruits are considered to be of ornamental value is designated as the attractive fruiting period. Although these periods will vary greatly from year to year, the relationship of one variety to another will hold quite well. Averages based on such data should be taken only as approximations for comparing one variety with another in this region and nothing more. Since the date for the beginning of the blossoming period is an average figure, for example, it should be borne in mind that there can be considerable variation from year to year for a locality and such a date can vary as much as two weeks from one part of the region to another. Likewise, the presence of attractive fruits will depend not only on the inherent nature of the tree but on weather and cultural conditions, as well as on the activity of birds.

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*We are most indebted to Drs. Roberts and Blaney, Oregon State University, for supplying us with this valuable summary of their experiences with crab apples over an extended period.

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In selecting the best from our collection of nearly 100 cultivars one must realize that personal prejudices no doubt influenced our choice of a particular tree. If one only considers those varieties that combine the greatest number of desirable attributes of ease of culture, disease resistance, annual flowering and fruiting displays, and foliage quality, a choice can easily be made of some fifteen to twenty cultivars. It becomes much more difficult to further restrict oneself and prepare a list of about ten to twelve cultivars. This we have done, knowing full well that not all our readers will agree with us. Detailed descriptions of the cultivars selected is not attempted since such information is available in the publications mentioned earlier. However, a brief statement supporting the selection of each variety is given. Because our collection has been regularly sprayed for control of apple scab in conjunction with scab control in adjacent plantings of edible apples, we cannot rate the crab apples in the collection for relative resistance based on our personal observation. Instead, we have had to rely on the observations of Dr. L. C. Chadwick at Ohio State University as to apple scab ratings. But in view of the precise environmental requirements for the growth of the scab organisms, those cultivars showing resistance or susceptibility to apple scab in Ohio would show the same relative resistance here. It is our opinion that cultivars susceptible to scab have little place in the average garden, since tree spraying is a difficult task without proper equipment. We make use of observations and opinions of Mr. Sam Rich of the Rich and Sons' Nursery of Hillsboro, Oregon, most of which have not been published by Mr. Rich but have been obtained through conversation and correspondence.

Question of Cold Resistance:

The question of cold hardiness is often raised. Hardiness ratings are difficult to make in that so much depends upon cultural con-

Below

Malus 'Katherine'

FIG. 2 PHOTO BY: WHITIE MARTEN

ditions during the previous summer and the weather during the autumn and early winter. Both strongly influence the acquisition of resistance to winter cold. Crab apples should be among the hardiest of the ornamental trees grown in the Pacific Northwest for they endure the much colder winters of the midwestern and eastern parts of Canada and the United States. Generally, crab apples are hardy here, but some years autumn weather conditions are such that trees remain in a growing condition until late in the season and are damaged by the first severe cold snap. Some gardeners then, in our opinion, jump to a hasty and unwarranted conclusion that some crab apple cultivars are tender and not able to survive our winters. The cold snap of November, 1955, illustrates this point quite well. The weather that year was warm and open until November 11, when the temperature abruptly fell to around 15 degrees Fahrenheit and remained there for several days. Many trees and shrubs were still actively growing and had not matured their tissues nor acquired that state which gardeners call 'winter-hardened.' Many gardeners and orchardists upon examining their prized trees often found the bark split and lifted away from the wood on the trunk and even up into the main scaffold branches. This was most frequent in trees which had been given good cultural care and less frequent in trees which had been neglected and uncared for. The following spring these damaged trees often leafed out and flowered, only to die later in the year. Consequently, some gardeners decided that the trees lacked winter hardiness and were not adapted to our gardens in the Pacific Northwest.

Such conclusions are indeed unfortunate. One should not confuse tenderness to cold in the late autumn and early winter with a true tenderness to cold later in the winter. Resistance to cold is slowly acquired, after growth has stopped and the new tissues lose their succulence, in response to the general fall in temperature as the year moves on into winter. Most years the temperature gradually falls and frosty nights occur with increasing frequency as winter approaches. Under such conditions some crab apple cultivars acquire such cold resistance that they experience with impunity temperatures as low as –30 to –40 degrees Fahrenheit, meriting their reputation for hardiness. The unusually favorable growing conditions during the autumn of 1955, which kept the trees actively growing, was largely responsible for the devastating effects of the November freeze rather than any inherent inability of our crab apples to withstand extremely cold winters. In our opinion all of our crab apple cultivars should be considered as winter hardy in the Pacific Northwest.

Some of the Best in the Northwest:

x **atrosanguinea**—Carmine Crab
Annual and outstanding in flower; single, deep pink or carmine blossoms; flowers do not fade; dark green, glossy foliage; disease resistant and easy to grow; small to medium-sized, broad, rounded shrub-like tree.

baccata mandshurica—Manchurian Crab
First in bloom; its annual, snow white flowers are early, frost-resistant and cover the tree profusely; red fruits attractive; fairly large upright tree; extremely hardy and disease resistant; blooms a few days before *micromalus.*

floribunda—Japanese Flowering Crab
Excellent in flower and fruit; its annual, pale-pink flowers fade to white; one of the oldest and most reliable cultivars; spreading shrub or small-sized tree; disease resistant and easy to grow.

hupehensis—Chinese Tea Crab
Distinctive vase-shaped tree; excellent in flower and foliage quality; pale pink to white flowers; fruits small and inconspicuous but attractive; annual flowering; disease resistant and easy to grow; comes fairly true from seed.

KATHERINE—Katherine Crab (fig. 2)
Excellent shrub-like plant; beautiful flowers born in abundance on slender branches; flowers double, pink to nearly white; young trees flower profusely; one of the best of the newer varieties; not as easy to grow as some.

x **micromalus**—Midget Crab
Flowers open pink and do not fade; one of the earliest in bloom; annual flowering; fruits attractive; upright, many-branched bush or small tree; disease resistant and easy to grow.

OEKONOMIERAT ECHTERMEYER — Echtermeyer Crab
Only weeping crab with purple foliage, flowers and fruit; graceful, beautiful plant for special uses; annual flowering; disease resistant and easy to grow.

purpurea Eleyi—Eley Crab or Jay Darling
One of the best; beautiful, round-headed tree; profuse flowering, even on young trees; flowers purplish-red, fading to pink; attractive purple-red fruits with red flesh; purplish to bronze foliage, attractive but susceptible to scab; excessive flowering some years makes it somewhat alternate in bearing.

(Continued on Page 30)

→ FIG. 3

Crabapple Performance Data

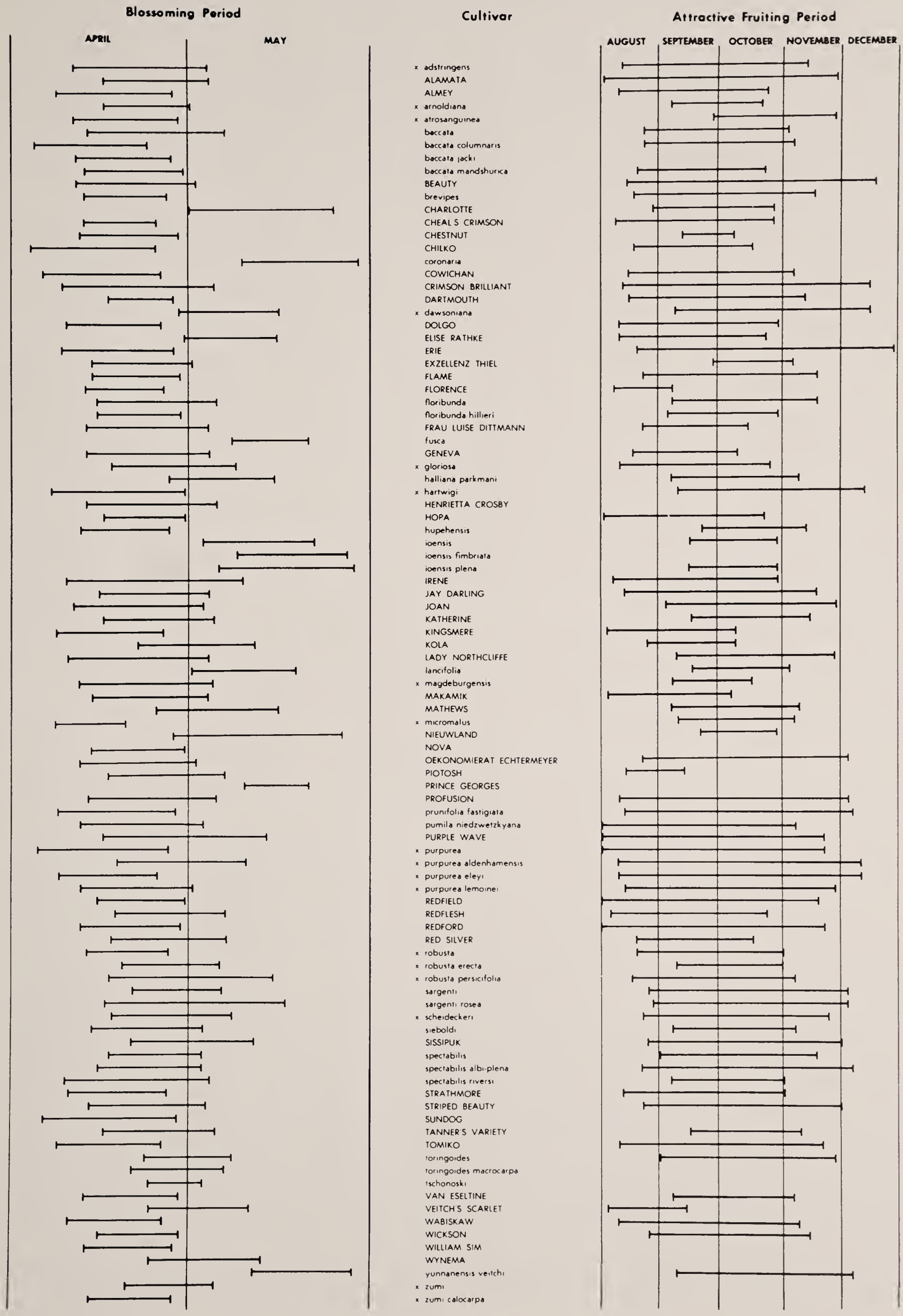

FIG. 3

Notes on Some Flowering Cherries That I Have Grown

RUDOLPH HENNY*

FLOWERING cherries are remarkably easy to grow in the Pacific Northwest and, once established, only a minimum of care is required for their well being. An occasional pruning of limbs that have grown across one another is necessary, but this need only be done every two or three years while the tree is young; later as the tree has assumed its growth shape not nearly so much pruning or trimming is required. Watering is generally not needed, and I have noticed that where the trees have been outside the influence of the sprinklers their growth has been more desirable, though slower and less vigorous. Sometimes when a tree is planted in the early spring irrigation to aid its establishment may be required, but if planted in good time in the fall or winter the tree will be well prepared for the warm and dry season to follow. I should also mention that young trees should be staked well when set out.

It has been written and stated that cherries in bloom at the edge of a reflecting pool of water or against a blue sky will show at their best. I always like to think that flowering cherries in bloom against an evergreen background of high fir trees surpass those in all other locations. A mature tree in full bloom in such a location is extremely effective early and late in the day, in clouds and sunshine, and even on the darkest rainy days.

The only pests of consequence here are the tent caterpillars that eat the foliage of the trees, and black aphids that are at their worst during a rainy wet spring. The latter distort the young foliage, and can be controlled easily with malathion, while the caterpillars are easily got rid of with DDT. Many seasons I ignore the aphids on the large trees, but the tent caterpillars can do tremendous damage and will defoliate a tree.

As to hardiness, several of the varieties were badly injured in 1950 when the temperature dropped to —10° F. The 1955 freeze was not as severe but came suddenly in early November when the trees were not fully dormant. I will call attention to trees that showed damage in both the above freezes as I discuss the varieties.

The larger trees, some of them now 15 years old or more, represent a collection of over twenty-five varieties and species. This paper will touch on only those that are distinct and favorites in our garden.

Prunus subhirtella var. *autumnalis*. This cherry is the first to bloom, usually in December or January. Mrs. Henny likes to think it is the last, and as I write these notes (January 8) the above variety has quite a display. The small white flowers are conspicuous on the bare branches in early winter, and a frost of several degrees seems not to injure them. It is not as striking as some of the later showy trees, but is indeed a most welcome novelty in the garden. *P. subhirtella* var. *autumnalis* is not a rampant grower and stays well within the limits of a small tree.

'Okame' is the first of the regular cherries to bloom in late March, a twiggy, finely branched tree with pink blooms. It is a most prolific bloomer, but was severely injured in the 1955 freeze.**

P. incisa var. *serrata*. This tree is slightly slower growing than the above, blooms two weeks later, and its fine small white flowers are exquisite. *P. incisa* var. *serrata* was hardy in the years 1950 and 1955.

P. Sargentii. One of the larger, more robust growing trees with pink single blooms, always reliable in the spring, this tree also shows spectacular foliage coloration in the fall. Several years ago I received as a gift from Ralph Jacobson, of Seattle, a tree of the above which has shown a very vivid scarlet fall color. My larger specimen grown in the woodland has usually been a bright yellow, and I often wonder if there are several varia-

*Editor of the American Rhododendron Society *Quarterly Bulletin*, and also an enthusiastic collector and grower of Japanese cherries.

**This is not surprising, since one of the parents of this hybrid is *Prunus campanulata*, native of Formosa and eastern China.—Ed.

tions of *P. Sargentii* in our garden, or if it is just a question of location.

P. serrula, the birch bark cherry. This species, though its sparse white flowers show rather poorly, is a most attractive tree, since the trunk and branches peel and display a shiny polished mahogany color. A very attractive tree for gardens.

The following are Japanese garden forms (clones), generally of *P. serrulata.*

'Amanogawa.' This upright growing tree has much the habit of a Lombardy poplar, since every branch will ascend and the entire branch system of a large tree may be not over three feet in diameter, but twenty feet in height. The pink flowers show in mid-season. The habit of growth of this tree lends itself effectively to the woodland garden.

'Asagi.' Perhaps this is a misnamed tree in our garden since it is much like 'Ukon' but differs in that it is heavily streaked with green in some petals.

'Fugenzo.' One of the later varieties in our woodland with flowers of good size, double and most profuse.

'Hisakura' is a finely shaped tree in our garden. The pink single blooms are most lovely. 'Hisakura' was injured only slightly in 1955.

'Horinji.' This is an open growing, upright tree with pale pink bloom, one of the favorites in the garden.

'Ojochin' is an upright growing tree of vigorous habit with large white flowers. My tree is now fifteen feet in height, and I always look forward to seeing the display of this fine cherry. The tree is hardy and has not been injured here.

'Shidare-yoshino' (weeping yoshino). The main attraction of this variety is its weeping habit, but the white blooms are very attractive when seen in massive drifts.

"Shimidsu,' one of the last to bloom during the season, in habit and growth is much like 'Shirotae.' The blooms, however, are borne on long pedicels and are very attractive in a larger tree where one can look up at the hanging flowers.

'Shirofugen' blooms quite late in the season and is a strong growing tree. The flowers are large, white and double. 'Shirofugen' is not as hardy as some, and in the November 1955 freeze it suffered considerably. I often wonder if its lateness of bloom and growth made it more vulnerable to cold damage, since in 1950 I noticed no damage.

"Shirotae' is a medium growing tree of good habit. The very large white bloom is quite striking. This variety is commonly known as 'Mt. Fuji.'

'Tai-haku.' This single white and largest of all cherries is a fine tree with bronzy new foliage. The blooms, nearly two and one-half inches in diameter, are quite unique due to their large size. The trees were uninjured in 1955, but had a slight splitting of bark in 1950.

'Takasago.' A slow growing small tree with pale pink blooms borne in great profusion in the last week of April. This, along with 'Akebono,' is our most profuse bloomer.

'Ukon' has single flowers of pale greenish yellow, making it unique amongst cherries. The tree makes a moderate growth each year.

'Yae-akebono' is a moderate growing tree of fine habit, and is Mrs. Henny's favorite every spring. Every limb from the trunk upwards is covered with pale pink blooms. The frost of 1955 injured this tree only moderately.

'Yedo-zakura.' This more or less sparsely branched tree of irregular growth habit usually shows its pale pink bloom in mid April. In my yearly notes I notice that this tree has become more attractive every season.

'Yoshino.' A large, rapid growing tree with pink to white flowers usually shown in early April. Here this is the most rapid growing tree of all the cherries.

In closing these notes I must make mention of two other unidentified varieties that I received from Dr. William Corbin as scions some years ago. We have tried many times to identify them, but to date have been unsuccessful. He had also received them as scions from abroad. The first he has designated as 'Hokusai Type,' which is a very slow growing prolific tree with pink double flowers borne so thickly as to hide the limbs.

(Continued on Page 27)

Background and Interplanting in Rhododendron Beds

DONALD G. GRAHAM*

THE vogue of shrub and tree borders is almost universally observed by garden owners today. It was not always so. In the early thirties when we started our present garden, we made extensive use of annuals, perennials, and tulip bulbs. We assumed that this was required in order to give us mass and continuity of bloom. Today, the annuals are only grown in the cutting garden. The perennials we so carefully selected and planted years ago have gone, for the most part, the way of all flesh. There are good reasons for this: (1) restricting ourselves to shrubs and trees enables us to keep up our 1¼-acre garden with one full-time gardener, and (2) the garden is more effective in all seasons with outstanding trees and shrubs whether they are in or out of bloom.

Because spring gives us more of a thrill so far as the garden is concerned, we have gone in heavily for rhododendrons and camellias. In spite of what some garden experts say, these two shrubs harmonize when interplanted or when respective beds of each adjoin. The camellias are at their best in March and April; the rhododendrons make their most effective display in late April, May, and early June.

Because borders exclusively planted to rhododendrons or camellias seem to us rather heavy and to a certain extent lack character, we use extensively as background or as interplantings a variety of flowering trees and shrubs. We don't insist on spring bloomers, although we do use many magnolias, cherries, and crabs. We also try to intersperse summer blooming trees and those that color attractively in the fall.

In the foreground of rhododendron and camellia plantings, we make extensive use of *Euphorbia Wulfenii,* which grows to three feet in height and even more in spread. It sets off the rhododendrons in May and June in a striking way with its huge heads of chartreuse green florets. We find blue flowers blend well with pastel shade rhododendrons and, therefore, plant masses of blue poppies, scillas, and bluebells. We make extensive use of lilies and also tree peonies towards the front of the rhododendron beds, as well as ferns. The low growing dainty pink *Primula vulgaris* sub-sp. *Sibthorpii*** from the Caucasus lives on with us from year to year and brightens the edges of a large rhododendron bed.

Here are some flowering subjects that we think are attractive in our garden, growing among rhododendrons and camellias:

Magnolia Soulangiana 'Lennei Alba' in the center of a bed of *R. Williamsianum* hybrid rhododendrons. *Eucryphia glutinosa* rising above *Rhododendron Loderi,* where its lavish August bloom is on a par in attraction with the previous May bloom of the rhododendrons. *Koelreuteria paniculata.* The deep yellow flowers in July and August are succeeded by attractive bladder-like fruits. The leaves turn yellow in the autumn.

Kolkwitzia amabilis. In our garden this shrub has grown to a height of 15 feet up through the branches of a nearby flowering crab. After the crab season of bloom, this shrub, known under the common name of "Beauty Bush," is covered with a mass of blooms somewhat smaller but similar to foxglove blossoms. They are a delicate pink with a yellow throat and make a striking display.

A variety of *Laburnum* imported from England, called "Longest and Latest," in June puts forth its golden yellow racemes up to 15 inches in length. *Catalpa Fargesii* var. *Duclouxii* is a small tree from western China with rosy pink flowers followed by 18-inch pods. It blooms in May and June. Towards the front of a border is the evergreen *Osmanthus Delavayi.* Its fragrant white flowers come in April.

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*President, Arboretum Foundation, knowledgeable plantsman and cultivator of fine plants.

**Formerly known as *P. acaulis* 'Rubra' or *P. altaica.*—Ed.

Two of the most attractive small flowering trees in the garden came from Japan. It is hard to find a more spectacular flowering tree than *Cornus Kousa* var. *chinensis* with its mid-summer blooms consisting of great white-bracted flowers almost touching one another over the whole area of every branch. *Styrax Obassia,* another native of Japan, produces its white flowers in June in 6- to 8-inch drooping racemes. They are fragrant and very similar to orange blossoms.

Two *Wisteria venusta* are planted in rhododendron beds on each side of the stairs between two levels of the garden. These are not allowed to grow as climbers but are trained as standards about five feet in height with a spread of eight to ten feet. Their six-inch racemes of large white fragrant florets coming in May complement the pink rhododendrons nearby and also scent the whole garden on quiet days (fig. 4).

Below

Wisteria venusta flowering in D. G. Graham garden, May 1953

FIG. 4 PHOTO BY: B. O. MULLIGAN

Because of lack of space I have not attempted to comment on the flowering cherries and crabs. My favorite is *Prunus yedoensis* 'Akebono,' two thirty-year-old specimens of which form a gateway to the steps between the upper and lower gardens. Against the blue sky they are a glorious sight, with each leafless branch laden with its soft pink blossoms.

ARBORETUM
WORK AND FUN DAY THIS YEAR

will be on April 17

9:00 A. M.

Come—(Bring Your Friends) and Wear a "Crazy Hat" (Prizes)

Coffee and Cookies Free to All

Biology and Control of the European Pine Shoot Moth in Western Washington; Progress Report

E. P. Breakey*

Historical Resume

THE European pine shoot moth was found in New York State in 1914. One year later, as the result of a survey in New York and neighboring states, the Federal government placed a quarantine against the importation of pines from Europe. The insect is presently established in the U.S. as far west as Ohio and Wisconsin. In 1927, the insect was discovered near Victoria, on Vancouver Island in British Columbia. The infested pines, *P. mugo* and Japanese red *(P. densiflora)*, were destroyed and the pine shoot moth was not seen again officially in British Columbia until 1938. A second attempt to eradicate was made at this time. Subsequently, it was recorded from Vancouver, B.C., in 1941 and 1943 and in Victoria in 1956 and 1958.

In May of 1959, specimens of the European pine shoot moth were taken from pines in Bellevue, Washington, and from pines in a nursery just south of Seattle. Although this is the first official record of the pest in Washington, there is evidence to indicate it was in the state as early as 1955 or 1956. Stock in the nursery south of Seattle shows irregular or distorted growth which is apparently identical to the growth resulting from known shoot moth injury. These abnormal growths are from seven to nine years old. Perhaps the most destructive and noticeable character is the "posthorn" growth, a development suggestive of a shepherd's crook.

Subsequent surveys have shown the insect is present in many places in Seattle and King County. Its presence has also been established in several places in Tacoma and Pierce County. An infestation was found in Shelton, another in Chehalis and several in Bellingham. That in Shelton has spread rather widely and was recently shown to have spread into the native stands of the lodgepole pine that are numerous and nearly continuous over a large part of Mason County.

A Serious Situation

The European pine shoot moth is very destructive and its presence in the Puget Sound country poses a serious hazard to the pine timber resources of the state. All citizens are, or should be, aware of the value of the forest industry and all that it represents in jobs, material, recreation, to say nothing of the conservation of snow and water, cover for game, etc. The residents of Western Washington have a problem that calls for their fullest cooperation and help. The State Department of Agriculture, the Department of Natural Resources, the U.S. Forest Service and the Western Washington Experiment Station all have been on the job since the pest was first found in the state. Certain local organizations, particularly the Seattle Men's Garden Club, have given valuable assistance and support. However, it will take state-wide cooperation by all interested groups and individuals if the pest is to be contained and controlled until an effective means of eradication can be found.

Quarantine

Those areas known to be infested with European pine shoot moth have been placed under quarantine. *It is illegal to move pines from these quarantined areas.*

What To Do

In the meantime, there are certain things which we, as citizens, can do that will be of great help to overcome this menace while there is still time:

1. **BECOME WELL INFORMED.** You can learn to detect the presence of the pest in your own pines, on those in the parks or playgrounds, about your campsites or around your summer homes. If a tree is suspected of harboring the pest, notify the district state horticultural inspector, ranger, farm forester, county agricultural agent, or the entomologists at the experiment stations. Do this without delay.

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*Dr. Breakey, entomologist at the Western Washington Experiment Station, Puyallup, has had the able assistance in this research of Messrs. Kent Elsie and Robert B. Hutt, both students at Washington State University, during the past several summers.

2. **LEARN THE MOST EFFECTIVE CONTROL MEASURES KNOWN TO DATE.** More effective controls are being found and the search will continue. These will be made available as fast as they are discovered. Have your garden club or service club provide one program each year on this subject. WSU's Extension Service will assist in providing this information.

3. **DO NOT PLANT CRIPPLED AND DISTORTED PINES.** Unfortunately, the use of crippled and distorted pines in landscaping the many new homes in this area became popular coincidental with the advent of the pine shoot moth. Instead of destroying these injured trees, it was suddenly discovered they were no longer culls; in many instances their value had been enhanced. The landscapers had suddenly gone "surrealistic." For a time it was thought these trees could be freed of pine shoot moth larvae by clipping, and many of these left the nurseries to be planted about homes, in parks, around public buildings, etc. We now know this is a very dangerous practice. The best trained men are apparently unable to detect all larvae that may be infesting any one tree, and so the pest is established in another location. Only those pines that have been fumigated after the last flight of moths in June or July or those grown in a nursery in an area free of infestation should be planted. Ask your landscaper to guarantee the pines he will use in planting your home will be free of pine shoot moth larvae. If a pine tree has natural symmetry, it is quite sure to be free of pests and other maladies.

4. **APPLY PROTECTIVE SPRAYS.** For the past several years, the timely application of DDT sprays has been the standard control. Recent work has shown, however, that Sevin and Diazinon will give appreciably better control when properly applied and at the right time. The average gardener can use either Sevin or Diazinon without danger to himself or others. Read the label and observe the precautions. Never leave insecticides where children can get at them. The moths start emerging early in June and begin laying eggs soon after. Moths continue to be active through July. The eggs are laid singly or in small groups, usually on the flat side of the needle, but occasionally on the twigs or at the base of a bud. They are placed well down near the fascicle that surrounds the base of each bundle of needles or in an equally inaccessible spot on the twig or at the base of a bud. The young larva starts life as a needle miner. By late summer or fall, the larva is much larger and enters a bud. All this means that the spray must be directed down into the tree from above and used in liberal amounts.

Use Sevin, 50 per cent wettable powder, at two pounds per 100 gallons. With Diazinon, use emulsifiable concentrate, at two quarts per 100 gallons. Either material should be applied four times: first, during the week of June 3; second, two weeks following the first; third, two weeks following the second application; and fourth, two weeks later. When these sprays were applied to heavily infested trees according to the above schedule, control was nearly perfect, much better than we are accustomed to expect. These suggestions are based on the results of three years' careful work.

5. **BE INFORMED. BE ALERT. SUPPORT THE MEN WHO ARE TRYING TO EFFECTIVELY COPE WITH THIS DIFFICULT SITUATION.**

The European Pine Shoot Moth

Perhaps you would like to know more about the appearance and behavior of this insect. The moth has a wing spread of approximately three-quarters of an inch. The forewings are reddish orange with wavy silvery irregular markings and a posterior fringe (i.e., along the back edge) of silvery scales. The hind wings are dark brown. Adult emergence begins in early June and continues for some six weeks, or until mid-July. A few stragglers may appear later than mid-July. Mating occurs within 24 hours, often within 12 hours, and egg laying follows immediately thereafter. The matter of placing the eggs was described earlier.

The newly-hatched larvae are dark red-brown with black heads. Each larva bores into a fascicle and mines out a considerable portion of the length of one or more needles. When the needles, or needle, starts to dry out, the larva leaves and enters another. Most of the larva's activity is confined to those

Below

Pine shoots damaged by European pine shoot moth larvae.

FIG. 4 PHOTO BY: DR. E. P. BREAKEY

portions of the pine needles enclosed in the fascicle. The third instar (stage) larva leaves the fascicle and enters a bud, feeding on the contents of the inside. Larvae enter the buds in late summer or early fall. Winter is passed in these buds. In late winter or early spring, the larva resumes its feeding, abandoning its winter quarters and attacks the developing candles. It usually bores into a candle (new shoot) and tunnels through a considerable portion of its length. Such candles are weakened and usually flop over. A single larva may attack and damage several candles. Sometimes, a larva may work between two candles, injuring both. These often break off near their bases. Larvae may enter candles well out toward their tips. Such candles usually become bent and hooked (fig. 4). Mature larvae are nearly three-quarters of an inch long and of a dirty white color.

Pupation begins in early or mid-May. After two to three weeks, the yellow-brown pupa starts to work itself upward in the tunnel left by the larval stage to escape. It is equipped with stout recurved spines that enable it to take a firm grip on the wall of its tunnel as it wriggles forward. It is also equipped with a stout spine that projects forward from the head. This is used when forcing its way through the dried pitch with which the burrow is closed. When about two-thirds of the pupa projects from the opening it has forced, the case splits along the back and the moth escapes to seek a mate and the cycle is complete.

Host Trees and Damage

The two and three needle pines constitute the host reservoir of the European pine shoot moth. *P. Mugo,* Scots, lodgepole and red pines are preferred above other species. Japanese red, Austrian and jack pines are also highly favored. The five needle pines are, for the most part, ignored by the pest in this country. Young trees or trees which naturally grow close to the ground are preferred. Infestation apparently does not occur to any appreciable extent above twenty or twenty-five feet.

Damage is extensive and readily apparent to the trained eye. Look for bundles of dead needles. The bud in which the third instar (stage) larva overwinters is usually killed outright. If this happens to be a terminal bud, a lateral or side bud replaces it by growing upward. This does not permit the tree to grow straight.

In the case of the growing candles which are attacked in the spring, deformation is quite severe. If the tunneled-out candles do not die, their own weight and lack of adequate support in the hollowed areas causes them to droop over. The resultant growth is a shoot which turns acutely toward the ground and then curves gently upward again.

Examination of a four-foot red pine in the Seward Park area in Seattle indicated that trees may be killed or at least substantially devitalized by a severe infestation. This tree had over 80 per cent of the buds occupied by larvae. Needle growth was sparse and browning off in early June. The owners of the property stated that the tree had been in a similar but not so severe condition the previous year. The tree showed three years of damage.

Infestation may generally be detected by the following symptoms: the presence of a bundle or two of dead needles in an otherwise healthy-appearing shoot, and an excess of resinous exudate around the infested bud. Closer examination will reveal the entrance hole in the bud. In the spring, the newly attacked candles quickly become distorted and bent, often being "glued" to one another by pitchy frass. The larval tunnels in the frass are easily discernable upon close inspection of the suspected tip.

Natural Enemies

Rearing studies conducted with specimens from various infested areas (Seattle, Sumner, Shelton and Fife) revealed two types of small wasp-like parasites attacking the larval shoot moth. One type feeds externally upon the larva, killing it prior to pupation. This species is about three-quarters of an inch in length as an adult. The second species attacks the larva internally, not emerging until after pupation has occurred. The adult parasite is one-quarter to one-third of an inch in length.

(Continued on Page 28)

Leaves from the University of Washington Arboretum

RICHARD B. WALKER*

I. How can weeds be controlled in plantings of woody perennials?

The control of herbaceous weeds in plantings of woody ornamentals is of particular concern in the spring season when the weeds often are just emerging or are still small. Although hand weeding may suffice to control them in small plantings, the amount of labor involved in extensive plantings is excessive. Cultivation is usually not practical in intensive plantings, and must be in any case used with much caution to avoid injuring the numerous roots often present near the surface.

Two types of practices may reduce or eliminate the necessity for hand weeding and cultivation: these are mulching and chemical weed control, which are described in more detail below.

MULCHES. The application of two or more inches of loose organic material such as wood chips will shade out most young weeds which germinate in the soil below, or make those very easy to pull which do manage to penetrate the mulch. Late winter or early spring is an ideal time for renewing mulches or applying them for the first time. Those who object to the light color of wood chips or sawdust can use coniferous bark or composted leaves. If plantings are made in rows, the use of polyethylene sheeting or special rolls of paper may be advisable. (For more details on mulches see Gessel, S. P., Mulches—Materials for, and use in Washington. *Arboretum Bulletin,* Autumn, 1958.)

CHEMICAL CONTROL. Woody plants are generally less susceptible to herbicides than are annual or even perennial weeds. Thus appropriate uses of such chemicals may be of great assistance in weed control in special problem areas or in extensive plantings. The following cautions in their use are advisable, however: 1) Follow specific instructions for a particular material faithfully; 2) in case of doubt or insufficient information about the susceptibility of a valuable planting to a herbicide, try the agent on a small part of the planting experimentally at first, allowing ample time (not less than 10-14 days) for checking this trial before applying the agent to the balance of the planting.

Two herbicides which have proved useful in nurseries in western Washington are listed below. In either case, they can be expected to be effective primarily against germinating weeds and are best applied to freshly worked, moist soil.

Sesone (formerly called Crag herbicide) is a rather safe material, but its effectiveness is limited to about a month, when it must be reapplied if needed. Sesone has the advantage that it is harmless to humans and animals even in the concentrated form. In moist soil it weathers to produce a mild concentration of 2,4-D.

Simazine is an effective material which has been tested by the Washington State University Experiment Station on nursery stock. Rates of application of only 1.6 pounds of the active ingredient per acre (1 ounce per 1000 square feet of wettable 80% powder) were used with good results in plantings such as *Pieris japonica, Pernettya mucronata, Euonymus radicans, Arctostaphylos Uva-ursi, Juniperus chinensis* 'Pfitzeriana' and *Rhododendron* 'Cynthia.' With such a low rate of application of a wettable powder, however, care must be exercised to be sure that the spray is constantly agitated and the material uniformly applied.

II. When should flowering trees be pruned? What principles should be followed in pruning them?

The most favorable time to prune is just after the blooming period, although the taking of cut flowers during the blooming may be the beginning of the pruning. This is the best

(Continued on Page 29)

*The second in our new series, contributed by Dr. Walker of the Dept. of Botany.

The Arboretum Bulletin

Vol. XXVI, No. 1 Seattle, Wash. Spring, 1963

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To keep memberships in the Arboretum Foundation in good standing, dues should be paid during the month payable. Active memberships more than three months in arrears will be dropped and The Bulletin will be discontinued.

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I hereby apply for membership in the Arboretum Foundation and remittance for same is enclosed to cover dues for the next succeeding 12 months.

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All memberships are non-assessable.

Notes & Comment

JANUARY 1963 was a cold month here by any standards. The U. S. Weather Bureau office in downtown Seattle reported that the average temperature was nearly 4° F. below that normally expected for the month. Arboretum records show that there were three days in which the maximum temperature didn't rise above 32° F. and sixteen days when the minimum temperature was below freezing. The coldest temperatures recorded were 14° F. on the 12th and 17° F. on the 11th. January was also a very dry month during which the arboretum's rain gauge measured only 2.37 inches of precipitation, as opposed to a normal of 4.91 inches.

Cold dry weather is very hard on broad-leaved evergreens and we expected to see more than the usual winter damage to many of our tender species. When we had an opportunity to make a preliminary evaluation in mid-February, we were pleasantly surprised to find how minor the damage seemed to be. As the season progresses we will find other cold injury now hidden, such as split bark or frost girdled stems on azaleas and rhododendrons and most probably blasted flower buds. Generally speaking though, the cold days in December hardened off most plants to a point where winter damage was minimal. Below is a partial list of some of the more obvious cold injury as it appeared on February 20, 1963.

Plants badly damaged, recovery in some cases doubtful.

Acacia dealbata—W
Cytisus proliferus—W
Eucalyptus Dalrympleana (25′ to 30′ tall)—A
Eucalyptus gigantea—A
Eugenia chequen—A & LH
Gordonia axillaris—LH
Loropetalum chinense—A
Nothofagus Solandri—A
Rosmarinus 'Lockwood'—W & LH
Viburnum japonicum—LH

Plants defoliated and/or cut back but recovery likely.

Acer oblongum—A

Ceanothus 'Sierra Blue'—W

Ceanothus species—A

Dendromecon Harfordii—W

Escallonia Ingramii—A

Eucalyptus species—A (many unscathed)

Hebe species—A & LH

Ilex vomitoria 'Xanthocarpa'—LH

Nothofagus cliffortioides—A

Persea Borboniana (one hardly damaged)—LH

Pinus taiwanensis (one of three plants)—LH

Plants with minor leaf damage or tops cut back.

Aristotelia chilensis—A

Ceanothus impressus 'Puget Blue'—W

Clematis Armandii—A

Drimus Winteri—LH, A

Fatshedera Lizei—A

Fremontia mexicana—W

Pieris Forrestii—LH

A—growing in Arboretum

LH—growing in lath house

W—growing against a south or west facing wall

J. A. W.

Membership Opportunity

The Arboretum Unit Council Membership Committee extends a warm invitation to any Foundation members not currently belonging to one of the Arboretum Units and interested in so doing, to call either the Arboretum Foundation office, EA 5-4510, or the Membership Chairman, Mrs. Elliott DeForest, AT 2-8065. A unit to be composed of interested persons, regardless of their place of residence, is about to be formed. Anyone interested may either join this group, or if preferred, may be placed in units already formed where there are vacancies and an expressed wish for more members. Approximately 56% of all Foundation members currently belong to units and enjoy the opportunity thus afforded to increase their knowledge of plant materials and to assist in projects of benefit to the Arboretum. All Foundation members are urged to help expand our membership by telling friends and acquaintances of the pleasure and mutual benefit to be had through membership in the Arboretum Foundation and its units.

Some of Our Favorites☆ ☆Won't You Send Us Yours?

PIERIS JAPONICA

SOME flowering shrubs make a magnificent display at blooming time, then remain uninteresting, or even unattractive, for the rest of the year. This is not true of *Pieris japonica,* a graceful shrub that displays something of interest with every season. Its glossy, deep green leaves and loose habit, sometimes drooping, sometimes erect, complements almost any planting of ericaceous shrubs. One combination I enjoy is *P. japonica* with *Azalea Vaseyi.* This deciduous azalea is particularly effective in winter, its stiff, bare branches reaching up through the lush *P. japonica* foliage to display fat, rose-tinted flower buds.

Years ago, when I bought my first shrubs from Oliver Ester, he asked me if I preferred the green or the red. Red *P. japonica?* He was, of course, referring to the flower buds and stems which can vary from a delicate green to deep maroon. These buds form so early in the fall, it is hard to believe they will wait until spring to bloom. In March or April it blooms profusely with heavy panicles of white, drooping, urn-shaped flowers, followed by new leaves which again may vary from light green to a showy bronze-red. In my garden, I have found an occasional plant to display new foliage as effectively as *P. Forrestii* and not be nearly so touchy.

Grown where it is happy, *P. japonica* will ultimately reach a height of eight to ten feet. It thrives in any light, peaty soil, in sun or semi-shade. However, if the situation is quite hot and dry, one would do better to use *P. floribunda* or *P. formosa.*

The variation found in *P. japonica* adds interest to its propagation. Cuttings root easily from late June through August, enabling a gardener to propagate his choicest shrub. Or, for the fun of seeing assorted results, try raising it from seed, which also germinates easily.

MARJORIE DICK

Some of Our Favorites
(Continued)

PENSTEMON

WE OFTEN admire extravagantly the exotic blossoms from far away countries, passing by the beautiful blooms from our own country.

The year I visited the famous botanical garden in Edinburgh, Scotland, it was the season when the only plants that gave the rock garden a burst of color were the penstemons that grew wild in our own state of Washington.

There are 150 species of *Penstemon* in the *Scrophulariaceae* family, all with showy, open, tubular flowers, chiefly native to North America. There are over a hundred different kinds listed in the "Manual of Higher Plants in Oregon." Foxgloves and snapdragons are members of this vast family. Nearly every state in the Union can boast of at least one species of *Penstemon* growing wild. They grow here and there along the highways in eastern Washington and in areas somewhat bereft of trees, a lovely sight repeating the fall coloring of deciduous trees.

A famous English gardener, Miss Eleanor Sinclair Rhode, once said, "Penstemons are, to my way of thinking, the most delightful of all autumn flowering plants in the herbaceous border. I far prefer them to the universally popular Coltness dahlias. A group of penstemons in the mixed colors, cherry, red, mauve, white, crimson etc. is a lovely sight in October, and they continue flowering until cut by severe frost." Reginald Farrer said, "*P. alpinus* is one of the most beautiful Penstemons. It leaves a memory behind and also seeds. It may be five inches high or five times as much; a heavenly shade of violent, clear blue with a white throat."

The low-growing penstemons decorate a rock garden and beautiful fall blooming flower groups can be formed by choosing color combinations that are brought from other parts of the garden.

Penstemons like well drained soil and plenty of sunshine. They endure mild winters unharmed when planted in sheltered situations.

GRACE T. DOWLING

This is your Arboretum, kept alive by your support

We are pleased to welcome the following new members (December 14, 1962 through March 6, 1963): *Contributing*—Mrs. Laura H. Cunningham. *Sustaining*—Lawrence Carlson, Mrs. Henry H. Ketcham, Edward H. Murray, Frank M. Preston, C. Edward Simons, Jr. *Annual*—Mrs. O. R. Adams, Mrs. R. G. Alden, Leonard I. Backman, Mrs. Andrew Bakun, Mrs. Ernest S. Bartlam, Mrs. Warren E. Berg, Mrs. C. B. Bergquist, Mrs. Charles Bowman, Jr., Mrs. William F. Braerman, Mrs. C. W. Butterfield, Mrs. Allan L. Caldwell, Mrs. John Castle, Mrs. John G. Clark, Mrs. Phillip E. Daily, Mrs. Myles S. Delano, Mrs. Richard Desimone, Mrs. Walter C. Doxsie, Mrs. K. William Edmark, Mrs. Douglas K. Fleming, Mrs. Alvin C. Formo, Mrs. Jack M. Geoffroy, Hamlin C. Grier, Mrs. Hugh H. Hambling, Edward J. Hartnett, Mrs. Douglas Hastings, Mrs. John F. Henry, Mrs. G. L. Hollingsworth, Mrs. Charles A. Hunter, Jr., Mrs. Duane Jensen, Mrs. Arthur P. Jentoft, Arthur O. Johnson, Mrs. Dorothy Letterman, Mrs. J. J. Lind, Mrs. William J. Linder, Mrs. Donald A. Martin, Mrs. E. S. McCandliss, Mrs. R. D. McCroskey, Mrs. Dixon K. McDonald, Mrs. Donald R. McDonald, Mrs. James B. McMillin, Mrs. A. U. Merlino, Mrs. Louis Miovski, Mrs. Robert Nelson, Mrs. William I. Niedermair, Norfolk Botanical Garden, Mrs. Foster R. Palmer, Mrs. R. W. Pedigo, Mrs. J. C. Piland, Mrs. Eugene T. Raymond, Mrs. A. P. Renton, Mrs. Edward J. Riley, Mrs. Jay Robinson, Jr., Mrs. T. J. Ross, Mrs. Sam C. Rousso, Mrs. Vance A. Sichler, Mrs. Warren R. Slemmons, Mrs. W. R. Smith, Mrs. E. G. Stanley, Mrs. Arnold Sturham, Mrs. W. W. Sutherland, Mrs. Charles A. Topinka, Mrs. Paul Volpe, Yoshihiro Watanabe, Mrs. John L. Wetherby, Mrs. Roger S. Wheeler, Mrs. George M. Wilson, Mrs. James D. Wright.

We are also most grateful to the following members who have raised their dues to: *Sponsor*—Mrs. Donald G. Graham. *Supporting*—Winlock Miller. *Contributing*—Charles W. Callahan, M. C. Collarino. *Sustaining*—Mrs. David L. Jones, Mrs. Ira O. McLemore, Mrs. George W. Williams.

BOOK REVIEWS

Some Good Garden Plants, by P. M. Synge & J. W. O. Platt; revised edition, Royal Horticultural Society, London, (1962); price 25 shillings, plus postage.

THIS is the latest edition of a very useful publication which first appeared in 1929, comprising brief but informative descriptions of most of the varied plants which have been given the Award of Garden Merit since 1922 by the Royal Horticultural Society, after growing them in the Gardens at Wisley, near London.

In this new volume of 232 pages — the last edition appeared in 1950 — no less than 356 plants are mentioned, the majority being shrubs; however, there are substantial numbers of trees, herbaceous perennials, rock garden, bulbous and climbing plants, so that all garden tastes can be found within its covers.

Since it is printed on a heavy, glazed paper the 265 black and white illustrations and four color plates (a *Chionodoxa,* two gentians and a *Hypericum*) are for the most part excellent portraits of the plants depicted. Many of them are the work of J. E. Downward, photographer for the Society; others are by H. Smith, W. Abbing and the late N. K. Gould, and are often of high quality and considerable beauty, for examples those of *Romneya Coulteri* by the last named (fig. 227), and Mr. Downward's *Iris unguicularis* (fig. 126). Of primulas and viburnums there are eight illustrations each, but double this number of various kinds of *Prunus,* forming valuable aids to recognition, especially in the two latter genera. It would have been preferable if the location of particular specimens or groups could have been included; for instance, the superb magnolias depicted in figs. 145, 146, 149 and 150, and the *Wisteria venusta* of fig. 266. Some of these would be worth a special pilgrimage to see at their peak of bloom, but only four illustrations seem to possess such information.

Two trees depicted are apparently incorrectly named; *Malus hupehensis* (fig. 153) is probably an unnamed Chinese species introduced by George Forrest, and the *Sorbus discolor,* as is suggested in the text, is not the original species given that name but more nearly related to the Japanese *S. commixta.* The correct spelling of the *Chaenomeles,* illustrated in fig. 41 and described on p. 39, is 'Phylis Moore.' The parentage of *Viburnum* x *Burkwoodii* (p. 225) is cited as *V. bitchiuense* x *V. utile,* but the *Jour. of the R.H.S.* (Jan. 1930) and W. J. Bean's *Trees & Shrubs,* III, (1933) state that it is *V. utile* x *V. Carlesii.* The name 'Louis Spath' should no longer be used for the lilac named 'Ludwig Spath' (p. 216).

Among the shrubs in the classified lists at the end of the book we find *Ilex Aquifolium* 'Camelliaefolia' and *Magnolia Kobus,* which should certainly be removed to the tree section, probably accompanied by *Cornus Mas* and *Cotoneaster frigidus.*

Apart from these minor criticisms this is an admirable work of its kind, particularly for the number and quality of the photographs used, as well as the variety of plants included. It would form an excellent adviser for many amateur gardeners as to what plants to grow, and is certainly applicable to our Puget Sound conditions.

B. O. M.

The Rhododendron & Camellia Year Book—1963. Royal Horticultural Society, London, England, 1962; price $2.00, including postage.

THERE is more than usual American interest in the 1963 Rhododendron and Camellia Yearbook.

Mr. H. H. Davidian's revision of the Series *Triflorum* is of prime importance to the experts of the rhododendron world. The articles on nomenclature and history of certain camellias will intrigue the buffs of that genus. However, a good share of this volume is devoted to American gardens and activities.

An article by Mr. Henry F. du Pont describes his Winterthur and how it came to be. Mr. C. Gordon Tyrrell, director of Winterthur, follows with another, more detailed, account of this remarkable garden. Probably the most interesting for us in the Northwest is the transcript of a lecture given by Dr. H. R. Fletcher to the Royal Horticultural Society in London, last May. It is a report on his tour of this coast in 1961 en route to the International Rhododendron Conference held in Portland. Many a name and plant will be recognized. Sir Giles Loder writes of "Camellias on the Gulf Coast" and describes the wealth of bloom, the many hybrids developed and the competitive shows. A brief account of the 1962 American Rhododendron Society meeting at Winterthur, by Mr. Tyrrell, completes the generous proportion of "American News."

A most pleasant rhododendron-hunting expedition into northeastern Turkey is recounted by Peter Cox and Peter Hutchison. How some rhododendrons can survive the heavy grazing that has been going on for centuries in this ancient land is most remarkable.

Discovery of old camellia plantings in New Zealand is described in an entertaining style by Col. T. Durrant. There are articles on frost damage and survival from the hard winter of 1961-62 in the British Isles, an excellent short piece on foliage characteristics of rhododendrons, and accounts of garden tours and plant trials. Illustrations, both in color and black and white, are excellent. A list of rhododendron and camellia awards and the newest additions to the *International Register* are included.

An excellent lecture on Rhododendron Species by Mrs. R. M. Harrison is the lead article. Read this for enjoyment — Mr. Davidian's revision is for study!

E. B. DUNN

* * *

Shrub Roses of To-day, by Graham S. Thomas. (Phoenix House, Ltd., London, 1962.) Price 42 shillings.

MR. THOMAS has already given us two books of considerable horticultural worth, *The Old Shrub Roses* (1955), and *Colour in the Winter Garden* (1957),—the former now in its fourth, revised edition — and here we have a third, like its predecessors delightfully and skillfully illustrated by the author with water-colors, photographs and pencil drawings.

This latest work takes up the story of the shrub roses where the older volume terminated, approximately in the third quarter of the 19th century, and covers such groups as those related to *Rosa canina, R. rugosa,* and *R. spinosissima,* with hybrids derived from them.

Since that period numerous species have been introduced to cultivation, prinicipally from western China, by E. H. Wilson, George Forrest and other plant collectors, although so far comparatively little use has been made of these in breeding new types.

Seven chapters are devoted to species other than the China roses and their hybrids, providing compact but adequate descriptions of each as they appear and behave in the south of England. Distinctions in the types used for names of species, sub-species or varieties, and garden forms or cultivars show immediately to which category each plant belongs. References to earlier illustrations are cited, and frequent comments made on the fragrance of flowers or foliage,—this, for example, on *R. pendulina* var. *pyrenaica;*—"it has a densely glandular receptacle and calyx, giving a pine-like hint to a lemony fragrance, and later bears slender scarlet hips." Strangely enough, he has nothing to say on the marked fragrance of 'Rose d'Amour,' in a lengthy and admirable description of this late-flowering plant in other respects.

A slight error occurs in quoting the habitat of *R. stellata,* on p. 110, as "Mountains of southwest Mexico," whereas it is found wild from western Texas to northern Arizona; the variety *mirifica* grows in New Mexico, not North Mexico.

The next five chapters cover the China roses, hybrid perpetuals, Poly-poms, hybrid musks, and finally the shrub roses of the 20th century,—a varied lot, but including some of great garden value,—'Agnes,' 'Fritz Nobis,' 'Fruhlingsgold,' 'Golden Wings,' 'Harry Maasz,' 'Nevada,' 'Scarlet Fire' and others. A number of 19th century hybrids appear in this chapter, for no evident reason; even the old *R. Dupontii,* raised about 150 years ago. Incidentally, the drawing of 'Nevada' (fig. 8) is one of the most life-like in the book.

There follows a key and simplified genealogy chart to the major groups of cultivated roses, by Gordon D. Rowley, formerly in charge of the National Rose Species collection at Hertford, England, together with two charts showing the origins of Kordes' hybrids of *R. rubiginosa,* the sweet brier, and of the modern hybrids of *R. spinosissima,* mostly from the same breeder.

Mr. Thomas completes his discussions with a chapter on fragrance in roses,—its sources, variations, identification, commercial production in Bulgaria,—and one on cultivation and pruning. He is an advocate of initial deep digging to prepare the bed for planting, followed by either annual mulching or the use of ground covering plants. Helpful suggestions are made for pruning the different types mentioned. Finally there is a bibliography of more than two pages,—from which G. A. Boulenger's publications on Asiatic *Rosa* species from Brussels, 1933-1936, is missing,—and a comprehensive index.

Summing up, it may be said that this is an excellent work on its subject, authoritative, interesting, attractively illustrated, well produced. One could only wish, after reading it, that space might be found here in the Northwest for a representative collection of these beautiful and varied shrubs, set out in an orderly fashion and properly maintained in a public park or garden. They would certainly be enjoyed in their seasons of flower and fruit.

B. O. M.

Plant Life of Palestine, by Michael Zohary. (The Ronald Press Co., New York, 1962; No. 33, *Chronica Botanica* New Series of Plant Science Books). Price $8.00.

IT HAS been said that the climate, the type of terrain, the fertility of the soil, all play their part in the development of men and nations. In the case of Palestine these factors were particularly important in the shaping of the history of this small country in the Near East.

Dr. Zohary's book is concerned with a land area of some 45,000 square miles (the State of Washington covers about 69,000 square miles). It is a region that is made up of desert wastes, roughly-hewn mountains, fertile green valleys,—an area confined by the Mediterranean Sea on the west and by the desert on the east. Our own geographical setting is, to some extent, not unlike the situation of Palestine, ranging from Puget Sound's humid climate, through the rugged Cascades to the arid eastern portions of our state. The variation in the amount of rainfall, from the desert areas of the Negev, with an occasional annual rainfall of 25 mm. (1 inch), to the subhumid climate of the Mediterranean region, is one factor in the great diversity of plant material. The most dominant of the 114 plant families are those with predominantly herbaceous species, though there are many fine evergreen and deciduous trees and shrubs in areas designated as "forests" and "maquis."

The author has been associated with the Hebrew University of Jerusalem since 1937 and has received well-deserved recognition for his botanical investigations in the Near East. He is particularly interested in the arboreal vegetation, past and present, and in the manner in which Man's activities have influenced the characteristics of the vegetation down through the thousands upon thousands of years that men have inhabited this area. Dr. Zohary has gone beyond a mere recording of the flora of Israel and Jordan, and has considered the ecological factors which have brought about the surprising diversity of plant types and the meaning this may have in evaluating the agricultural potential of the region.

Botanically speaking, this is a most interesting study of one small area of the earth's surface, but non-scientific students would also find this work useful in illuminating one more segment of our Judeo-Christian heritage.

PAT BALLARD

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Notes on Some Flowering Cherries That I Have Grown

(Continued from Page 15)

The other is a medium growing tree with double pink fragrant blooms of good size. This he has designated as 'Pink Double No Name.' Both are very fine and usually bloom at the same time in mid-season.

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Biology and Control of the European Pine Shoot Moth

(Continued from Page 20)

These specimens have not, as yet, been identified by a specialist.

Unfortunately, complete data from this study were unobtainable. Of some seven hundred specimens procured for the study, less than one hundred survived to emerge as adults. Larva mortality was very slight, less than 2 per cent. The pupae, however, began to succumb in large numbers within seven to ten days of pupation. Accompanying death was a yellowish, oily exudate which apparently oozed from the membranous areas. This may possibly be the result of a disease.

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The Arboretum; Fall and Winter 1962

(Continued from Page 5)

house have been burned but will probably recover; amongst these are *Ardisia japonica, Pieris Forrestii, Gaultheria oppositifolia, Persea Borbonia,* and *Camellia saluenensis.*

On the other hand we have had some pleasant surprises; several species or hybrids of *Arctostaphylos,* as well as *Erica lusitanica* from Portugal, continued to flower during the cold weather, while the Cistus show very little injury and *Michelia compressa* none at all. We shall undoubtedly learn a little more about the hardiness of our plants from this visitation.

Miscellaneous Figures

Traffic Count (outside offices, on Arboretum Drive): 1962, 152,005; 1961, 148,145; 1960, 141,033 cars.

A large increase (10,600 cars) was recorded in June, July and August 1962, no doubt due to the World's Fair in Seattle.

Japanese Garden Attendance (June through October: 1962, 64,422; 1961, 49,824; (increase, 14,600).

Telephone information enquiries: 1962, 1,940; 1961, 2,061; (decrease, 121).

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Leaves from the University of Washington Arboretum

(Continued from Page 21)

time because the balance of the growing season remains for the development of flower buds for the next year. If pruning is done later in the growing season or in the dormant period many developing flower buds may be removed.

In the pruning, it is well to keep in mind the shape and size of tree desired in a particular location. In most instances a light yearly shaping is much better than a drastic pruning every few years. Also, the limbs should be observed carefully with respect to the crotches and vigor of growth. Weak limbs are usually good ones to eliminate or trim back. Weak crotches can usually be eliminated if the shape of the tree is planned from early age.

Different species vary with respect to the type of branches on which the blossoms are borne. In apple and pear the spur shoots bear most of the flowers, so branches with abundant spur shoots should be favored, since one of the major objects of pruning is to maintain a maximum of vigorous flowering shoots. Peaches flower mostly on lateral one-year-old twigs, so excessively heavy pruning may sharply reduce blooming the next year. Cherries (Japanese types) produce most flowers laterally on one-year-old twigs as well, so it is necessary to prune promptly after blooming to allow ample time for the development of the twigs and buds for the next season.

The Massachusetts Horticultural Society has announced the award of one of their large gold medals for 1962 to the Director of our Arboretum, Brian O. Mulligan, for his work here, his professional accomplishments, and his writings in this *Bulletin*. Such notable recognition of the Arboretum and its Director from this long-established Society is most warmly appreciated by all who are aware of its progress in recent years.

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Crab Apples in the Pacific Northwest

(Continued from Page 12)

purpurea Lemoinei—Lemoine Crab
One of the best red-flowered varieties; annual flowering, but flowers only after 5-6 years of age; bright purplish-red flowers; fruits too dark to be showy until leaf fall; large, spreading tree that is disease resistant and easily grown.

x **robusta persicifolia**—Peachleaf Crab
One of the best for flower and fruit display; flowers in great profusion; rose-pink in bud, fade to white; red fruits showy, excellent for jelly, last all winter; peach-like foliage; long slender branches form a shrub rather than tree; very hardy, disease resistant tree; may be alternate in bearing because of heavy fruit set in 'on' years.

Sargentii and **Sargentii rosea**—Sargent Crab
Dwarf, shrub-like tree, probably the smallest growing of the crabs; *rosea* or Pink Sargent differs only in color of flowers and may be somewhat more vigorous; small attractive white or pink flowers, borne late and in abundance; fruits small but attractive and long lasting; plants are disease resistant and easy to grow.

x **Scheideckeri**—Scheidecker Crab
One of the favorites; beautiful, rose-pink, semi-double blossoms borne in very dense clusters all along slender branches; small size makes it a desirable tree or shrub in most gardens; lends itself to training in various forms; florists like it for forcing in spring; small yellow fruits attractive; disease resistant and thrifty tree.

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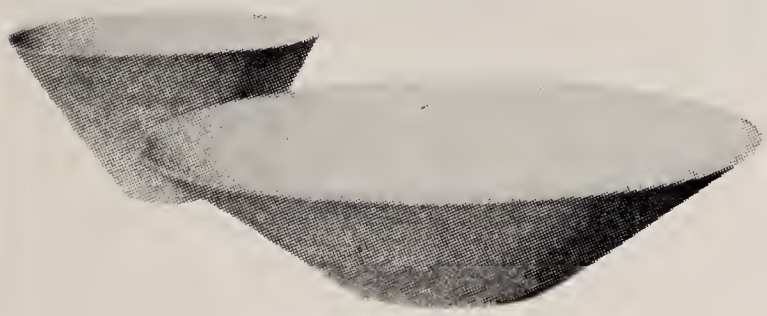

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